

KARPAGA VINAYAGA COLLEGE OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF CIVIL ENGINEERING

COURSE OUTCOME

SEMESTER I	
COs	HS8151 COMMUNICATIVE ENGLISH - I
1	Enable the development in sharing information about family and friends.
2	Strengthen general comprehending skills and present lucid skills in free writing.
3	Understand the basic grammar techniques and utilize it in enhancing language development.
4	Foster an environment for reading and develop good language skills.
5	Develop flair for any kind of writing with rich vocabulary and proper syntax.
6	Proficiency in writing technical articles and presenting papers on any topic of any genre.
COs	MA8151 ENGINEERING MATHEMATICS
1	Use both the limit definition and rules of differentiation to differentiate functions.
2	Apply differentiation to solve maxima and minima problems.
3	Evaluate integrals both by using Riemann sums and by using the Fundamental Theorem of Calculus.
4	Apply integration to compute multiple integrals, area, volume, integrals in polar coordinates, in addition to change of order and change of variables.
5	Apply various techniques in solving differential equations, fractions and integration by parts.
6	Apply the concepts of integration, differentiation and differential equations in life time problems.
COs	PH8151 ENGINEERING PHYSICS
1	Discuss the Young's modulus and Rigidity modulus of elasticity of materials and its determination through experimental methods
2	Describe the characteristics of laser and their applications in semiconductor laser

3	Discuss the principle behind the propagation of light through an optical fiber and its application in sensors
4	Summarize the different modes of heat transfer
5	Relate the quantum concepts in electron microscopes
6	Describe the unit cell characteristics and the growth of crystals
COs	CY8151 ENGINEERING CHEMISTRY
1	Summarize the water related problems in boilers and their treatment techniques
2	Discuss the applications of adsorption in the field of water and air pollution abatement.
3	Discuss the types of catalysis and the mechanism of enzyme catalysis
4	Associate phase rule in the alloying and the behaviour of one component and two component systems using phase diagram
5	Explain various types of fuels, their manufacturing processes and calculation of calorific theoretically
6	Summarize the principles and generation of energy in batteries ,nuclear reactors, solar cells, wind mills and fuel cells
COs	GE8151 PROBLEM SOLVING AND PYTHON PROGRAMMING
1	Discuss the logical solutions through Flowcharts, Algorithms and Pseudo code
2	Explain the syntax for python programming constructs.
3	Compute the flow of the program to obtain the programmatic solution.
4	Examine the programs with sub problems using 'Python' language.
5	Compute the compound data using Python lists, tuples, and dictionaries
6	Apply python programs to read and write data from/to files.
COs	GE8152 ENGINEERING GRAPHICS
1	Make free hand sketching of basic geometrical constructions and multiple views of objects.
2	Develop orthographic projection of lines and plane surfaces.
3	Do projections and solids and development of surfaces

4	Prepare isometric and perspective sections of simple solids.
5	Demonstrate computer aided drafting.
6	Develop the Perspective projection of simple solids-Prisms, pyramids and cylinders by visual ray method
COs	GE8161 PROBLEM SOLVING AND PYTHON PROGRAMMING LABORATORY
1	Write, test, and debug simple Python programs.
2	Apply the concept of conditionals and loops in Python programs.
3	Develop the Python programs step-wise by defining functions and calling them.
4	Use Python lists, tuples, dictionaries for representing compound data.
5	Read and write data from/to files in Python.
6	Apply the concept of Pygame.
COs	BS8161 PHYSICS AND CHEMISTRY LABORATORY
1	Determine the rigidity modulus of the wire by torsional pendulum
2	Determine the Young's modulus of the material by uniform bending method
3	Determine the Numerical aperture and acceptance angle
4	Determine the thickness of wire using air wedge
5	Determine the velocity and compressibility using ultrasonic
6	Determine the band gap of a semiconductors

SEMESTER – II	
COs	HS8251 TECHNICAL ENGLISH -II
1	Breakdown the ideas into its elementary constituents, analyze and act after a meaningful thought process.
2	Analyze the phrase and passage and explicitly pass on the ideas meaningfully.
3	Manage to interpret the given phrase or the graphical rendering and review the contents well individually or as a group.
4	Concentrate on the communication aspect of complicated ideas and respond positively.
5	Debate the issues and find the rudiments of the problem individually and as a group.
6	Respond intelligently and seek clarification and understand completely.
COs	HS8151 MATHEMATICS -II
1	Students will find the eigen values and eigen vectors of the matrices
2	Students will be able know the concepts of Solenoidal and irrotational vector fields
3	Students will be able to apply the concepts of cauchy rimann equations
4	Students will be able to apply the concepts of cauchy integral theorem and cauchy residue theorem
5	Students will be able to learn about laplace functions and unit step functions
6	Students can find the inverse laplace function using the convolution theorem
COs	PH8201 PHYSICS FOR CIVIL ENGINEERING
1	Express their knowledge about the thermal performance of buildings using thermal physics concepts.
2	Acquire the knowledge of designing the buildings with good acoustic properties for perfect sound wave propagation.
3	Interpret the fundamental knowledge about the lighting designs for buildings with artificial lighting.
4	Explain the properties and applications of new engineering materials.
5	Explain the performance of engineering materials.

6	Acquire the knowledge about the hazards and protecting factors of hazards for various types of hazards.
COs	BE8251 BASIC ELECTRICAL AND ELECTRONICS ENGINEERING
1	Identify the electrical components and explain the characteristics of electrical machines.
2	Identify electronics components and understand the characteristics
3	Understand the fundamentals of semiconductor and applications.
4	Understand the principles of digital electronics
5	Analyze and use the techniques of communication and its types.
6	Analyze the digital techniques
COs	GE8291 ENVIRONMENTAL SCIENCE AND ENGINEERING
1	Interpret the food chains, food webs and ecological pyramids
2	Describe about the environmental pollution such as air pollution, water pollution, soil pollution and thermal pollution
3	Understand the forest resources, food, resources, land resources and water resources
4	Interpret the resettlement and rehabilitation of people
5	Create awareness environment and human health, human rights and value education
6	Describe the role of information technology in environment and human health
COs	GE8292 ENGINEERING MECHANICS
1	Describe the equilibrium of a particle in space using principle of laws of mechanics
2	Calculate the equilibrium of rigid bodies in two dimensions and in three dimensions.
3	Calculate the principal moment of inertia of plane areas.
4	Solve the problems using equation of motions and analyze impact of elastic bodies on collision.
5	Solve the problems of simple system with sliding friction and calculate linear and angular acceleration of moving body in general plane motion.

6	Apply the Laws of Mechanics for solving problem on Vectorial representation of forces
COs	GE8261 ENGINEERING PRACTICE LABORATORY
1	Show carpentry components and pipe connections including plumbing works.
2	Prepare the arc welding of butt joints, lap joints and tee joints.
3	Demonstrate the electrical and electronics circuit connection
4	Produce the Simple Turning and Taper turning
5	Develop the different jobs using sheet metal
6	Explain the principles of centrifugal pump and air conditioner
COs	CE8211 COMPUTER AIDED BUILDING DRAWING
1	Acquire knowledge to work in Autocad Software
2	Develop drafting skills in drawing the plan, elevation and sectional views of the buildings using computer software.
3	Acquire knowledge about the principles of planning, orientation and complete joinery details.
4	Develop drafting skills of R.C.C. framed structures using computer software.
5	Develop drafting skills of different types of roof structures using computer software.
6	Develop drafting skills of Industrial buildings using computer software.

SEMESTER III	
COs	MA8353 TRANSFORMS AND PARTIAL DIFFERENTIAL EQUATIONS
1	Students would get familiarize about the Fourier series to generate a sequence of waves
2	Students would have learnt about the Fourier Transform to a sequence of non parabolic waves to a general function.
3	Students will be familiar with the construction of partial differential equation and finding methods to solve it
4	Students would gain knowledge about the applications of PDE in Chemical Engineering
5	Students would have acquired knowledge on Z Transforms for a 3D model and its solution
6	Formulate and solve some of the physical problems
COs	CE8301 STRENGTH OF MATERIALS I
1	Describe the concepts of stress and strain, principal stresses and principal planes.
2	Determine the Shear Force and Bending Moment in beams
3	Estimate the load transfer in beams, the induced stress resultants and deformations.
4	Calculate the deflection of beams by different methods and selection of method for determining slope and deflection.
5	Design the circular shafts and helical springs by using basic equation of torsion
6	Examine the pin jointed plane and space trusses.
COs	CE8302 FLUID MECHANICS
1	Describe the concepts of fluids in static, kinematic and dynamic equilibrium.
2	Describe the properties of fluids
3	Solve the problems related to equation of motion.
4	Describe the dimensional and model analysis.
5	Recognise the types of flow and losses of flow in pipes.
6	Solve the Boundary Layer Problems.

COs	CE8351 SURVEYING
1	Solve the real world Civil Engineering problems by using the various methods of plane and geodetic surveying.
2	Recognize about the use of various surveying instruments and mapping.
3	Calculate horizontal and vertical angles using different instruments.
4	Predict the corrections and adjust simple triangulation works.
5	Recognize the methods to determine time, longitude, latitude and azimuth and the concepts of hydrographic surveying.
6	Describe the concept and principles of modern surveying.
COs	CE8391 CONSTRUCTION MATERIALS
1	Identify the various materials commonly used in civil engineering construction and their properties.
2	Compare the properties of most common and advanced building materials.
3	Recognize the typical and potential applications of lime, cement and aggregates.
4	Describe the production of concrete and also the method of placing and making of concrete elements.
5	Recognize about the applications of timbers and other materials.
6	Recognize the importance of modern material for construction.
COs	CE8392 ENGINEERING GEOLOGY
1	Acquire the knowledge of earth, earthquake, volcanism, theory of plate tectonics and the action of various geological agencies.
2	Assess the Geological aspects in relevance to civil engineering structures.
3	Describe the physical properties of various minerals
4	Interpret the formation of rocks their types, distribution and uses.
5	Interpret geological maps and identify the geological structures from the maps.
6	Utilize geological knowledge in projects such as dams, tunnels, bridges, roads, airport and harbor

COs	CE8311 CONSTRUCTION MATERIALS LABORATORY
1	Describe the behavior of construction materials.
2	Appraise the quality control while testing/ sampling and acceptance criteria.
3	Utilize the principles and procedures on testing of construction materials.
4	Determine the properties of fresh and hardened concrete.
5	Test the construction materials and components of construction elements experimentally.
6	Determine the properties of bricks, blocks and tiles according to the required specifications.
COs	CE8361 SURVEYING LABORATORY
1	Operate basic survey instruments including Theodolite, Tacheometry, Total Station and GPS.
2	Acquire knowledge to carryout Triangulation
3	Acquire knowledge to carryout Astronomical surveying including general field marking.
4	Acquire the knowledge to work with levelling instruments.
5	Acquire knowledge to do field work using Total Station.
6	Acquire knowledge of surveying works related to land and civil engineering projects
COs	HS8381 INTERPERSONAL SKILLS / LISTENING AND SPEAKING
1	Provide guidance and practice in basic general and classroom conversation and to engage in specific academic speaking activities.
2	Improve general and academic listening skills
3	Make effective presentations
4	Summarize academic readings and lectures conversational speech listening to and participating in conversations
5	Articulate a complete idea as opposed to producing fragmented utterances
6	Make the students for group discussion

SEMESTER IV	
Cos	MA8491 NUMERICAL METHODS
1	Understand the basic concepts and techniques of solving algebraic and transcendental equations.
2	Apply the numerical techniques of interpolation and error approximations in various intervals in real life situations.
3	Apply the numerical techniques of differentiation and integration for engineering problems.
4	Understand the numerical techniques of differentiation and integration which plays an important role in engineering and technology disciplines.
5	Understand the knowledge of various techniques and methods for solving first and second order ordinary differential equations.
6	Solve the partial and ordinary differential equations with initial and boundary conditions by using certain techniques with engineering applications.
Cos	CE8401 CONSTRUCTION TECHNIQUES AND PRACTICES
1	Choose the various construction techniques, practices and the equipment needed for different types of construction activities.
2	Classify the different construction techniques and structural systems.
3	Describe various techniques and practices on masonry construction, flooring, and roofing.
4	Identify the requirements for substructure construction.
5	Recognize the methods and techniques involved in the construction of various types of super structures
6	Choose, maintain and operate hand and power tools and equipment used in the building construction sites.
COs	CE8401 STRENGTH OF MATERIALS II
1	Describe the concept of analyzing indeterminate beam
2	Compute the deflection of determinate beams, frames and trusses using energy principles.
3	Analyze the propped cantilever, fixed beams and continuous beams using theorem of three moment equation for external loadings and support settlements.

4	Determine the load carrying capacity of columns and stresses induced in columns and Cylinders.
5	Determine the principal stresses and planes for an element in three dimensional state of stress and study various theories of failure.
6	Determine the shear center, stresses in curved beams and stresses due to Unsymmetrical bending of beams.
COs	CE8403 APPLIED HYDRAULIC ENGINEERING
1	Apply their knowledge of fluid mechanics in addressing problems in open channels
2	Interpret the theory and practice of problems in hydraulic engineering.
3	Solve problems in gradually varied flows in steady state conditions.
4	Use the energy equation and momentum equation for rapidly varied flow.
5	Analyze the performance of turbines.
6	Analyze the performance of a centrifugal pump.
COs	CE8404 CONCRETE TECHNOLOGY
1	Describe the various requirements of cement, aggregates and water for making concrete.
2	Explain the properties of materials for concrete by suitable tests, mix design for concrete and special concretes.
3	Interpret the effect of admixtures on properties of concrete
4	Design concrete mix as per IS method
5	Explain the properties of concrete at fresh and hardened state
6	Recognise the importance and application of special concretes.
COs	CE8491 SOIL MECHANICS
1	Classify the soil based on their index properties
2	Describe the concepts of compaction, flow through soil, stress transformation, stress distribution, consolidation and shear strength of soils.
3	Calculate the permeability of soil, seepage flow and seepage pressure.
4	Calculate the settlement of soil mass by using the Terzaghi's one dimensional consolidation theory

5	Determine the shear strength of cohesion-less and cohesive soils.
6	Identify the stability of infinite and finite slopes by applying the principles of soil mechanics.
COs	CE8481 STRENGTH OF MATERIALS LABORATORY
1	Describe the testing of materials and components of structural elements experimentally.
2	Determine the tensile strength on steel and compressive strength for wood
3	Estimate the impact strength of metal by using Izod and Charpy test.
4	Determine the Rockwell and brinell hardness number for various metals.
5	Estimate the deflection of beams.
6	Determine the compression on helical spring.
COs	CE8461 HYDRAULIC ENGINEERING LABORATORY
1	Describe the calibration of rotometer.
2	Calculate the coefficient of discharge of orifice, mouthpiece and venturimeter.
3	Test the Bernoulli's energy equation.
4	Estimate the flow in pipes and frictional losses.
5	Develop the characteristics curves for pumps and turbines.
6	Test the principles studied in theory by performing the experiments in lab.
COs	HS8461 ADVANCED READING AND WRITING
1	Develop a paragraph: topic sentence, supporting sentences, concluding sentence
2	Develop students' critical thinking skills.
3	Provide more opportunities to develop their project and proposal writing skills.
4	State reasons and examples to support ideas in writing
5	Understand the pronoun reference and use of connectors in a passage.
6	Show the critical thinking in various professional contexts.

SEMESTER V	
COs	CE8501 DESIGN OF REINFORCED CEMENT CONCRETE ELEMENTS
1	Define the concepts for design of structural systems with reference to Indian standard code of practice.
2	Describe various design methodologies for the design of RC elements
3	Analysis and design of flanged beams by limit state method and sign of beams for shear, bond and torsion
4	Design the various types of slabs and staircase by limit state method
5	Design of columns for axial, uni-axial and bi-axial eccentric loadings.
6	Design of footing by limit state method
COs	CE8502 STRUCTURAL ANALYSIS I
1	Acquire the knowledge of basic theory and concepts of classical methods of structural analysis
2	Analyze continuous beams, pin-jointed indeterminate plane frames and rigid plane frames by strain energy method
3	Analyze the continuous beams and rigid frames by using the concept of slope deflection method.
4	Analyze the continuous beams and rigid frames by using the concept of Moment Distribution Method.
5	Analyze the indeterminate pin jointed plane frames continuous beams and rigid frames using matrix flexibility method
6	Analyze of continuous beams, pin jointed trusses and rigid plane frames by using the concept of matrix stiffness method
COs	EN8491 WATER SUPPLY ENGINEERING
1	Estimate the total water demand for a town/city
2	Acquire knowledge about the water transport, treatment and distribution
3	Acquire knowledge in various unit operations and processes in water treatment
4	Design the various functional units in water treatment
5	Understand the water quality criteria and standards, and their relation to public health

6	Design and evaluate water supply project alternatives on basis of chosen criteria
COs	CE8591 FOUNDATION ENGINEERING
1	Understand the site investigation, methods and sampling.
2	Gain knowledge on bearing capacity and testing methods
3	Design the shallow footings
4	Acquire knowledge about the Contact pressure and settlement of footings
5	Determine the load carrying capacity, settlement of pile foundation
6	Determine the earth pressure on retaining walls and analysis for stability
COs	PROFESSIONAL ELECTIVE I GI8491 TOTAL STATION AND GPS SURVEYING
1	Understand the working principles of total station and GPS instruments
2	Acquire knowledge about the propagation of EMR through atmosphere and corrections for its effects
3	Gain knowledge about the functioning of various types total station and GPS equipments and their applications
4	Explain the methods of study on geological structure.
5	Solve the surveying problems.
6	Various techniques available for surveying and mapping with total station and GPS.
COs	OPEN ELECTIVE I ORO551 RENEWABLE ENERGY SOURCES
1	Describe the Economics of renewable energy systems.
2	Calculate the ranges of Solar Radiation using flat plate collector.
3	Classify the Wind Energy Systems
4	Prepare the alternate fuel such as ethanol and bio diesel
5	Explain the Open and Closed OTEC Cycles system

6	Interpret the Solar PV Applications.
COs	CE8511 SOIL MECHANICS LABORATORY
1	Perform test to determine Index properties and classify the soil.
2	Perform test to determine engineering properties through standard tests and empirical correction with index properties.
3	Acquire knowledge on behavior and the performance of saturated soil.
4	Acquire knowledge on the techniques to determine index properties.
5	Perform to determine the engineering properties such as shear strength, compressibility and permeability by conducting appropriate tests.
6	Acquire knowledge to handle the instruments for determining the engineering properties of soil
COs	CE8512 WATER AND WASTE WATER ANALYSIS LABORATORY
1	Analyze the physical, chemical and biological characteristics of water and waste water.
2	Quantify the pollutant concentration in water and waste water.
3	Suggest the type of treatment required amount of dosage required for the treatment.
4	Examine the conditions for the growth of micro-organisms.
5	Acquire knowledge to quantify the sludge.
6	Determine dissolved oxygen, BOD and COD for a given sample
COs	CE8513 Survey Camp (2 weeks –During IV Semester)
1	Acquire knowledge about surveying the points of inaccessible.
2	Acquire practical knowledge to do the traversing by the total station.
3	Acquire practical knowledge about contouring
4	Determine the latitude and longitude of the location by using total station.
5	Acquire knowledge in handling the total station.
6	Perform mapping and contouring the area.

SEMESTER VI	
COs	CE8601 DESIGN OF STEEL STRUCTURAL ELEMENTS
1	Understand the concepts of various design philosophies
2	Design the structural systems such as roof trusses, gantry girders as per provisions of current code of practice for working stress and Limit state Method.
3	Design the bolted and welded connections for steel structures
4	Design the tension members and understand the effect of shear lag.
5	Design the axially loaded columns and column base connections.
6	Design the laterally restrained and unrestrained steel beams.
COs	CE8602 STRUCTURAL ANALYSIS II
1	Analyze the effect of moving loads and to construct influence line diagram for determinate beams
2	Draw the influence lines for statically indeterminate beams.
3	Analyse the three hinged, two hinged and fixed arches.
4	Analyse the suspension bridges with stiffening girders
5	Draw the Influence lines for three hinged stiffening girders.
6	Analyzing the beams and rigid frames by using the concept of plastic analysis.
COs	CE8603 IRRIGATION ENGINEERING
1	Acquire knowledge and skills on crop water requirements.
2	Understand the methods and management of irrigation.
3	Gain knowledge on types of Impounding structures.
4	Understand methods of irrigation including canal irrigation.
5	Design lined and unlined canals
6	Acquire knowledge on water management on optimization of water use.

COs	CE8604 HIGHWAY ENGINEERING
1	Infer concepts of highway planning and cross sectional elements of pavement
2	Compute sight distance requirements and design of geometric elements, horizontal profile and vertical profile of a road
3	Acquire knowledge to design flexible and rigid pavements.
4	Acquire knowledge on Highway construction materials, properties and testing methods
5	Understand the concept of pavement management system, evaluation of distress and maintenance of pavements.
6	Understand the concepts of strengthening of pavements
COs	EN8592 WASTEWATER ENGINEERING
1	Analyze the physical, chemical, and biological phenomena for successful design, operation and maintenance of sewage treatment plants.
2	Estimate sewage generation and design sewer system including sewage pumping stations.
3	Acquire knowledge on the characteristics and composition of sewage, self-purification of streams.
4	Design of the unit operations and processes that are used in sewage treatment
5	Acquire knowledge about the standard methods for disposal of sewage.
6	Gain knowledge on sludge treatment and disposal.
COs	PROFESSIONAL ELECTIVE II
	CE8005 AIR POLLUTION AND CONTROL ENGINEERING
1	Students will able to understand the nature and characteristics of air pollutants.
2	Students will able to understand the basic concepts of air quality management.
3	Students will able to identify, formulate and solve air pollution problems.
4	Students will able to design stacks and particulate air pollution control devices to meet applicable standards
5	Students will able to select control equipments.

6	Students will able to ensure quality, control and preventive measures.
COs	CE8611 HIGHWAY ENGINEERING LABORATORY
1	Demonstrate the principles and procedures of testing of highway materials
2	Acquire knowledge about the techniques to characterize various pavement materials through relevant tests.
3	Perform the testing of aggregates such as specific gravity, Gradation of Aggregate, Abrasion Value and Water absorption of aggregates.
4	Acquire knowledge to handle the instruments used for testing of bitumen.
5	Perform the testing of bitumen for specific gravity, penetration test, viscosity, softening point, Ductility test.
6	Determine the binder content, Marshall stability and flow values.
COs	CE8612 IRRIGATION AND ENVIRONMENTAL ENGINEERING DRAWING
1	Design and draw various units of Municipal water treatment plants and sewage treatment plants
2	Design and draw the tank components and impounding structures.
3	Design and draw the cross drainage works
4	Design and draw the canal regulation structures.
5	Design and draw the water supply and treatment
6	Design and draw the Sewage treatment and disposal.
COs	HS8581 PROFESSIONAL COMMUNICATION
1	Make effective presentations.
2	Participate confidently in Group Discussions.
3	Attend job interviews and be successful in them.
4	Develop adequate Soft Skills required for the workplace.
5	Recognise differences between groups and teams.
6	Develop a long term career plan-making career changes.

SEMESTER VII	
COs	CE8701 ESTIMATION, COSTING AND VALUATION ENGINEERING
1	Explain the quantity estimation for buildings.
2	Rate analysis for all building works, canals and roads.
3	Illustrate detailed and general specification along with principles for report preparation.
4	Explain types, procedure and drafting model in tender.
5	Explain types, formation, condition and problems in contract.
6	Evaluate valuation for building and land.
COs	CE8702 RAILWAYS, AIRPORTS, DOCKS AND HARBOUR ENGINEERING
1	Illustrate the methods of route alignment and design elements in Railway Planning and Constructions.
2	Explain the Construction Techniques and Maintenance of Track Laying and Railway Stations.
3	Describe the ICAO Airport Classifications and Planning.
4	Illustrate the Elements for Orientation of Runway with Markings and Passengers Facility Systems.
5	Define the Basic terms in Harbour Engineering, Planning and Designing of Harbour.
6	Explains Inland Water Transportation, Wave Action on Various Coastal Structures and Coastal Protection Works.
COs	CE8703 STRUCTURAL DESIGN AND DRAWING
1	Designing and Detailing of Reinforced Concrete Cantilever and Counterfort Retaining walls.
2	Designing and Detailing of Flat Slab.
3	Design and Drawing of RC Solid Slab Bridge.
4	Designing and Detailing of RCC and Steel Water Tank.
5	Design and Drawing of Various Steel Building Components.
6	Design and Drawing of Welded Plate Girder and Industrial Gantry Girder.

COs	PROFESSIONAL ELECTIVE III EN8591 MUNICIPAL SOLID WASTE MANAGEMENT
1	Explains the nature and characteristics of municipal solid wastes.
2	Describe the regulatory requirement regarding municipal solid waste management.
3	Describe the reduction, reuse and recycling of waste.
4	Illustrate the ability to plan and design systems for storage, collation, transport, processing and disposal of municipal solid waste.
5	Describe knowledge on the issues on solid waste management from an integrated and holistic perspective, as well as in the local and international context.
6	Designing and operation of sanitary landfills.
COs	OPEN ELECTIVE II OML751 TESTING OF MATERIALS
1	Classify the materials testing and select the tool and machine
2	Do the different mechanical testing such as hardness, impact, tensile
3	Describe the Principles, Techniques, Advantages, Limitations and Applications of non destructive testing.
4	Interpret the different characterization techniques such as SEM and TEM
5	Do the other testing such as thermal testing and chemical testing
6	Analyse the element by Inductively Coupled Plasma-Optical Emission Spectroscopy and Plasma-Mass Spectrometry.
Cos	CE8711 CREATIVE AND INNOVATIVE PROJECT (ACTIVITY BASED - SUBJECT RELATED)
1	Identifies the field of interest by finding the topic for the project.
2	Gathering of information from literatures and journals.
3	Illustrate the abstract of the project.
4	Explains the objective and methodology carried for project.
5	Carry out the design, fabrication or developing computer codes.
6	Demonstrate the novelty of the project through result and outcomes.

COs	CE8712 INDUSTRIAL TRAINING (4 WEEKS DURING VI SEMESTER – SUMMER)
1	Illustrate the surrounding opportunities and fields about civil engineering.
2	Explains the textbook knowledge implementation in the actual practice.
3	Illustrate the working methodology.
4	Explains the role of employees in the organization.
5	Describe the concepts for development and implementation of new techniques.
6	Describe the critical situation and develops the decision making skills.

SEMESTER VIII	
COs	PROFESSIONAL ELECTIVE IV GE8076 PROFESSIONAL ETHICS IN ENGINEERING
1	Illustrate the human value and ways for professional excellence and stress management.
2	Explains engineering ethics by variety of moral issues, types of inquiry, customs and religion and uses of ethical theory.
3	Illustrate the engineering as social experimentation.
4	Explain the assessment of safety and risk.
5	Describe the rights like professional rights, employee rights, intellectual property rights and discrimination.
6	Explains the global issues on various field ethics and responsibility.
COs	PROFESSIONAL ELECTIVE V CE8020 MAINTENANCE, REPAIR AND REHABILITATION OF STRUCTURES
1	Illustrate the Importance of Maintenance and Assessment Procedure for Evaluating Damaged Structures.
2	Explains the Strength and Durability of Concrete due to the Effect of Climate.
3	Acquire knowledge about Recent Trends in Concrete.
4	Explains the Non-Destructive Testing and Corrosion Protection Techniques.
5	Illustrate the Strengthening and Repairing of Structures due to Corrosion, Leakage, Fire and Earthquake.
6	Explains the Structural Health Monitoring and Demolition Techniques.
COs	CE8811 PROJECT WORK
1	Illustrate the Sequence of work.
2	Explains the Practical Problem and Challenges.
3	Describe the Methodology to Complete the Activity
4	Analysis the Project on Comparing with Various Literatures.
5	Illustrate the Importance of Testing Equipments and Software to Complete the Project.
6	Illustrate the Steps in Project Report Preparation.